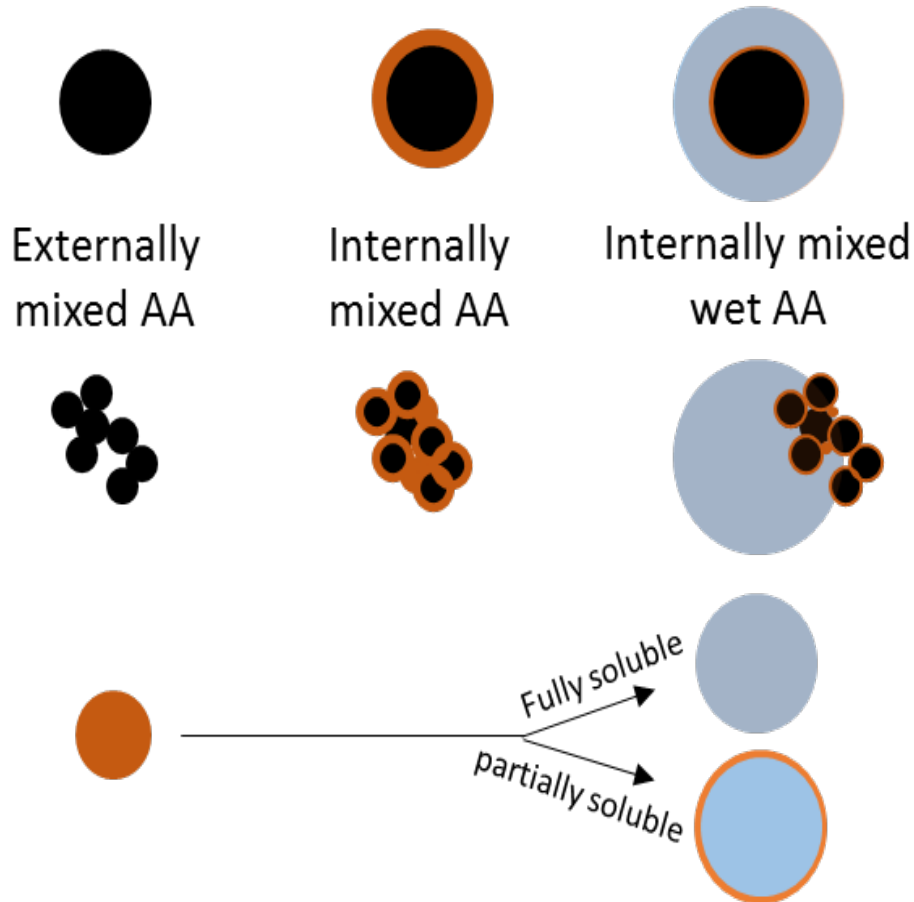


# WATER UPTAKE BY BB BC/BrC AEROSOLS: ABSORPTION & LIFETIME

M. Dubey & C. Cappa

Uncertainty in absorption by aerosols due to water uptake

Absorption?



Impact of water uptake on **absorption** is *undercharacterized*, with variable results, especially for refractory absorbing aerosols

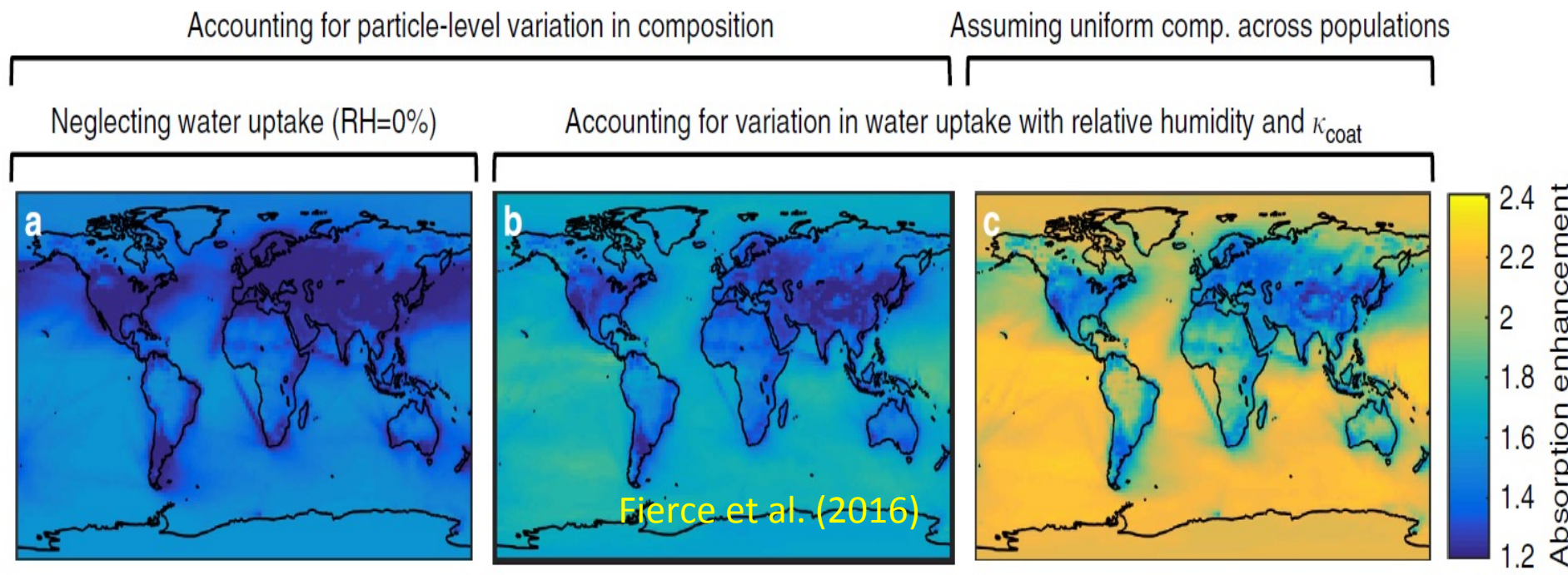
Depends on:

- Internal configuration
- Solubility of both AA and non-AA components
- Particle size

**Applicable to brown carbon!**

# Uncertainty in absorption by aerosols due to water uptake

Models indicate water *can* contribute substantially to absorption by refractory AA, when core-shell behavior is **assumed**

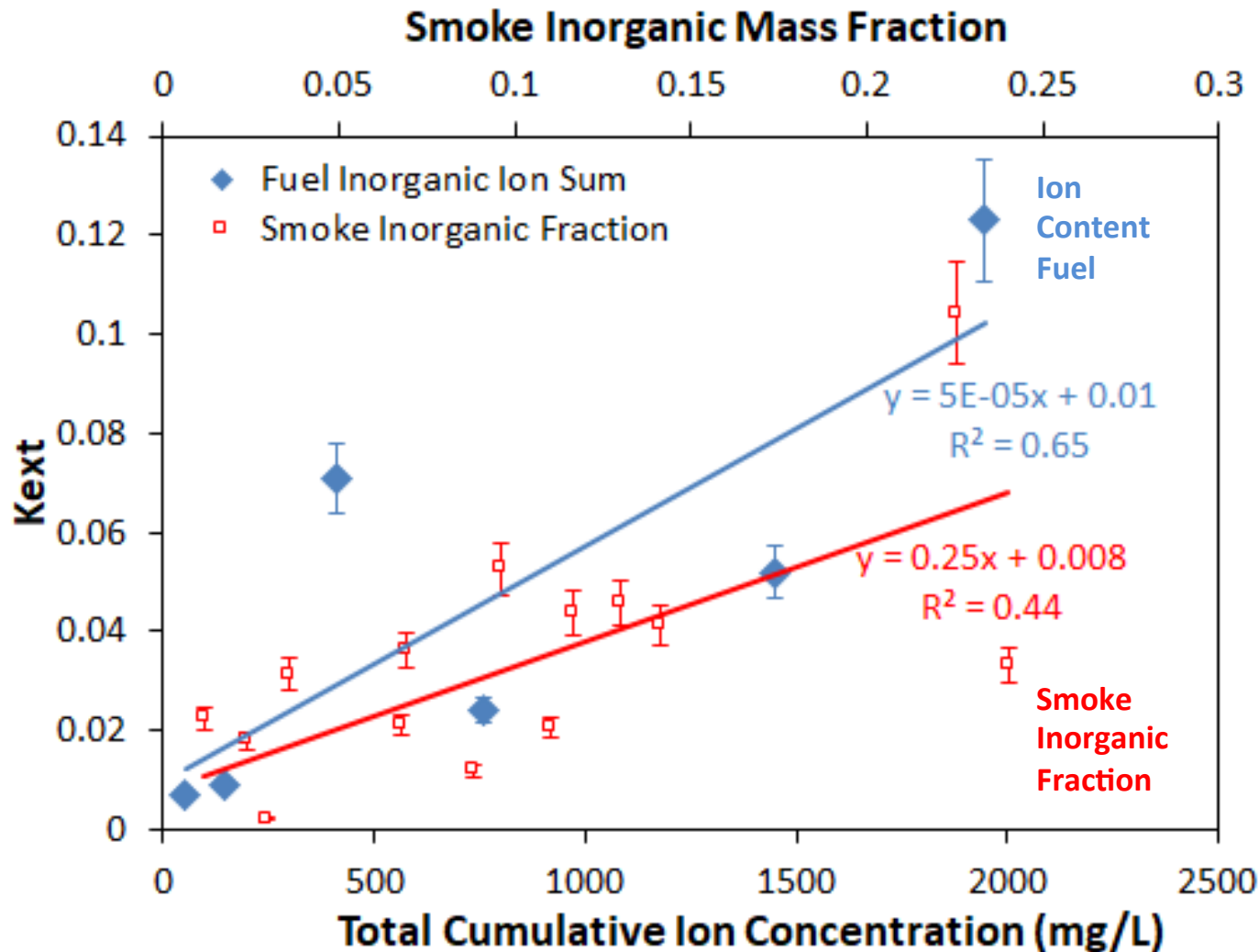


Journal of Geophysical Research: Atmospheres 2014

Effects of biomass burning on climate, accounting for heat and moisture fluxes, black and brown carbon, and cloud absorption effects

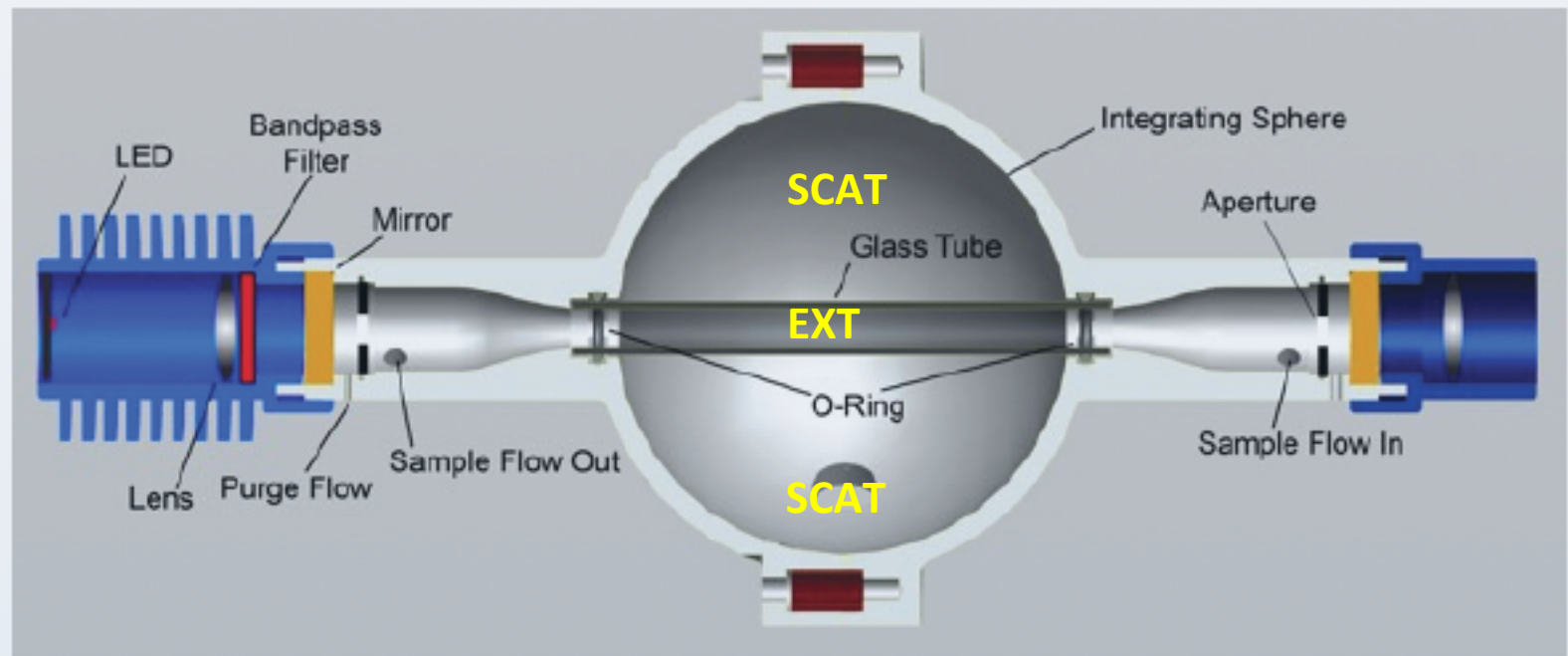
Biomass burning was calculated to cause 20 year global warming of ~0.4 K because CAE I (~32% of BB warming), CAE II, semidirect effects, AHFs (~7% of BB warming), AMFs, and tar balls from biomass burning together outweighed indirect effects, contrary to previous biomass burning studies that did not treat CAEs, AHFs, AMFs, or brown carbon. AHFs from all sources and AMF + AHF from power plants and electricity use

# K vs. BB Smoke Inorganic Fraction & Fuel Ion Content



Clear trend in  $\kappa$  with fuel/smoke ion composition & Other factors (e.g. MCE, T) can explain the variance from trend

# Measure (Extinction-Scattering) with Humidity Controlled CAPS-SSA



**HUMIDITY CONTROL (dry to 85%)**